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EXAMINER

PENDLETON, BRIAN T

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 14

Application Number: 09/747,709
Filing Date: December 20, 2000
Appellant(s): GRAUMANN ET AL.

Mr. Christopher K. Gagne
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed March 20, 2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims 1-10, 12-14, 16, 17, 19-24 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) *Prior Art of Record*

Art Unit: 2644

5,890,104	HOLLIER	3-1999
5,410,595	PARK	4-1995

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-10, 12-14, 16, 17, and 19-24 are rejected under 35 U.S.C. 103. This rejection is set forth in prior Office Action, Paper No. 9.

(11) Response to Argument

Appellant argues that the rejection of claims 1, 12, 19 and 22 under 35 U.S.C. 103(a) using Vahatalo et al was improper stating that the reference does not teach or suggest the claim limitations. Page 14 of the Appeal Brief states that claim 1 requires two or more signal streams to be created in an audio channel. Appellant asserts that Vahatalo et al do not disclose two or more signal streams. Examiner disagrees with such an assertion. While the descriptions of Rin and Sin are of ports in column 5 lines 5-10, the ports have signal streams inputted into them. At port Rin, the speech signal from a speaker A is received (column 4 line 67 – column 5 line 1) and at port Sin, the speech signal from a speaker B and a portion of the speech signal from speaker A reflected from the hybrid line B is received (column 5 lines 2-5). Thus, two signal streams are created in the audio channel, which is the transmission line between speaker A and speaker B.

Appellant also argues that Sin and Rin are electrical signals, not audio signals. The echo canceller of figure 4 shown in Vahatalo et al is directed to canceling speech signal echoes. Speech signals are audio signals. The hybrid line circuit of Vahatalo et

Art Unit: 2644

al transmits audio signals. As indicated in the rejection, the echo cancellation feature of Vahatalo et al is for hybrid line echo, not acoustical echo, however, one of ordinary skill in the art would have known that echo cancellers are built to cancel either type of echo. The main function of an echo canceller using an adaptive filter is to create an estimate of the echo and subtract it from the transmitted speech signal out. Figure 4 of Vahatalo et al illustrate the principle with adaptive filter 40 and subtractor 41. The instant application uses an echo canceller and subtractor. Whether the echo signal was created acoustically or electrically by a transmission line was irrelevant. As long as an estimate of the echo signal can be created, the echo can be cancelled from the outgoing speech signal to be transmitted to a remote party. Furthermore, one of ordinary skill in the art would have known that determining echo location using correlation, which is done by both the Appellant and Vahatalo et al, was the same for both cases of echo cancellation. The only difference was that echo signals in the acoustic echo canceller have to be transduced by a microphone. Once input into a digital signal processor, the origins of the signals were irrelevant and the processor can use an algorithm to correlate (detect) the signal streams.

Vahatalo et al also provided suggestion to find the echo path delay, which is the same as active latency characterization, as called by the Appellant. As discussed in column 1 lines 51 – 65, echo cancellation relies of the correlation of the speech signal and returned echo signal. In column 3 lines 40 – 44, the objection of Vahatalo's invention was alignment of the adaptive filter to a location of an echo. Thus, although the types of echoes are dissimilar for the instant application and the reference, the

Art Unit: 2644

intention to find the echo location is found in each. Once the echo location was found, cancellation was optimized.

Lastly, Appellant maintains that Vahatalo et al do not disclose delaying one or more of the signal streams based on the time measured between detections of the two signal streams. Examiner disagrees with that statement. It is the Examiner's contention that sampling units 45 and 46 of Vahatalo et al are used to sample the speech signal outgoing to the echo path and the speech signal incoming from the echo path (column 3 line 49 – column 4 line 3). The samples are stored in memory and correlated using calculator 44. The calculator is responsible for measuring the time between detections of the two signal streams. After the echo delay is measured the adjustable delay element 43 is set to the delay calculated. Therefore, that feature was taught by Vahatalo et al since delay 43 delays the signal stream from port Rin.

Claim 12 recites a method for characterizing the latency of an audio channel by creating two waveforms. It is the Examiner's contention that the speech signals of Vahatalo et al are waveforms and that the claim limitations are suggested by the reference.

Claims 19 and 22 are analogous to claims 1 and 12, respectively. They represent a computer system executing instructions stored on a machine-readable storage medium that result in the method steps of claims 1 and 12. At the time of invention, it was obvious to program a computer to accomplish signal processing tasks. Computer programs and their associated storage mediums were well known.

On page 16 of the Appeal Brief, the combination of Vahatalo et al and Park et al is challenged with respect to claims 2-4, 7-10 and 16-17. Appellant claims that the neither Vahatalo et al or Park et al teach or suggest creating two signal streams or waveforms in an audio channel, delaying one or more of the signal streams or waveforms based on the time measured between detections of the at least two signal streams or waveforms. However, as discussed above, Vahatalo et al already suggested those method steps. Park et al was relied upon for showing an output device (loudspeaker) and input device (microphone) in an acoustic echo cancellation environment which requires finding the echo location for optimization, the difference between Vahatalo et al and the claimed invention (claim 2). See column 2 lines 7-60. It was asserted by the Appellant that Park et al does not recognize the latency estimation issue that exists in a computer environment. Inherently, a computer environment with speakerphone capabilities has difficulty with acoustic echo cancellation because it has a microphone and loudspeaker. Park et al was directed to finding the echo location in an acoustic echo cancellation environment, therefore one of ordinary skill in the art would have known its application to a computer environment without it explicitly being shown. As stated above, since one of ordinary skill in the art would have known that digital signal processors worked on acoustic and hybrid line echoes, it was obvious to apply the acoustic echo cancellation technique of Park et al using a loudspeaker and microphone in the invention of Vahatalo et al. The echo location algorithm of Vahatalo et al was equipped to find the echo location whether the signals came from the hybrid

Art Unit: 2644

line B or acoustically since it relied on the sampling units 45, 46 and calculator 44 for correlating signals.

Regarding claims 5-6, the Appellant argues that the combination of Vahatalo et al, Park et al and Hollier do not render the claims obvious. The only line of reasoning offered is that the combination does not teach or suggest creating two signal streams or waveforms in an audio channel, delaying one or more of the signal streams or waveforms based on the time measured between detections of the at least two signal streams or waveforms. However, as discussed above, Vahatalo et al already suggested those method steps. Hollier is supplied to show the teaching that a chirp or pseudo-random sequence signal can be used to test audio equipment. There was motivation to use such different signals since Vahatalo et al teaches in column 3 lines 40-44 that signaling tones can be used to align the adaptive filter of an echo canceller to an echo location. The use of known signals to calculate echo delay was obvious, as suggested by Vahatalo et al. One of ordinary skill would have known the benefits of a chirp or pseudo-random sequence signal and used them accordingly to find an echo location.

Finally, Appellant disputes the combination of Vahatalo et al and Hollier for the rejections of claims 13, 14, 20, 21, 23 and 24. Again, the only argument submitted by Appellant is that the combination does not teach nor suggest creating two signal streams or waveforms in an audio channel, delaying one or more of the signal streams or waveforms based on the time measured between detections of the at least two signal streams or waveforms. Vahatalo et al already suggested those method steps. Hollier is

Art Unit: 2644

relied upon to show a teaching that using known waveforms in testing audio equipment was well known at the time of invention.


For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



btp
June 16, 2003

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